ecology and environment, inc.

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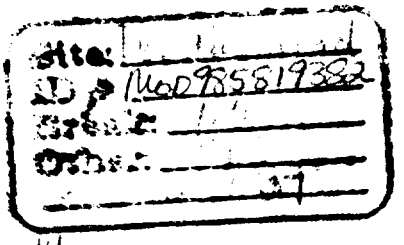


MEMORANDUM

TO: Paul Doherty, EPA/DPO

FROM: Sharon Geil, E&E/TAT

THRU: Joe Chandler, E&E/TATL (Acting)

DATE: February 7, 1989

SUBJECT: Doe Run Lead Co.
TDD: T07-8811-015
PAN: TM00733SAA
Incident Notification Report # 11248-D-1400

INCIDENT

Ecology & Environment, Inc., Technical Assistance Team (E & E/TAT) member Mike Michalowski received a call from Mr. Ken Teeter of the Missouri Department of Natural Resources (MDNR) at 1615 hours on November 28, 1988 requesting assistance with a controlled release of sulfuric acid into the Mississippi River from a sunken barge. Paul Doherty of the U.S. Environmental Protection Agency (EPA) Emergency Planning and Response (EP&R) group was contacted by TAT and authorized participation by TAT in this incident.

E & E/TAT members Mike Michalowski and Sharon Geil were assigned to respond to the incident.

BACKGROUND

The sulfuric acid was a by-product of lead smelting activities at the Doe Run Co., Herculaneum, Missouri (see site map). The acid is normally loaded onto barges and transported down the Mississippi River to a fertilizer plant in Louisiana. Acid barge ACO 501, owned by Aiple Towing Co. of Stillwater, Minnesota, was loaded with approximately 1300 tons of liquid sulfuric acid on November 21, 1988 and was to be picked up by a tugboat on November 23rd. The barge was reported missing on the 24th, but was not located until the 27th when it was determined that it had sunk at the dock.

On November 28, 1988 a meeting attended by personnel from Doe Run, MDNR, U.S. Coast Guard (USCG), both EPA Region V and EPA Region VII, and other concerned parties was held to determine the preferred course of action. Primary considerations were to minimize water contact with the sulfuric acid cargo (93% H_2SO_4), stress to the barge hull, potential for contamination/danger to personnel or the surrounding population, and to provide for continuous monitoring of water pH changes and air quality. The salvage option selected was a

controlled release of the cargo into the Mississippi River using an air-lift system to remove acid from the tanks (for ease of reading the word "pumping" will be used hereafter). E & E/TAT was to provide continuous monitoring of river pH to ensure it did not drop below 6.0. Commander Tim Josiah of the USCG was the on-site coordinator (OSC), and the USCG provided continuous air monitoring, and a 32' boat from which to monitor river pH. Okie Moore Diving and Salvage Co. provided the air-lift, equipment to raise the sunken barge, and salvage operation personnel. Operations were scheduled to begin the morning of November 29, 1988.

E & E assigned Mr. Michalowski to mobilize the required equipment from EPA and E&E warehouses and leave from Kansas City the evening of November 28th to meet with Ms. Geil of the E&E/TAT St. Louis office.

ON-SCENE ACTIVITIES

E & E/TAT met Mr. Ken Teeter of MDNR at 0730 hours the morning of November 29 and proceeded to the Doe Run dock. TAT/MDNR arrived on-site at 0845 hours and was briefed by USCG strike force team leader Lieutenant Commander Glenn Wiltshire. The acid pumping was performed by personnel from Okie Moore Diving and Salvage using an air-lift. TAT and MDNR were tasked to monitor the pH of the Mississippi River 100 and 1000 yards downstream of the sunken barge from a 32' boat piloted by USCG personnel during the controlled release. A pH of 6.0 was set as the action level. Using an ISCO peristaltic pump connected to a graduated 30' weighted line and continuous LED read-out Orion Research Model 211 pH meter calibrated at pH 7 and pH 4, TAT began providing continuous pH monitoring at 1135 hours. Photographs of the monitoring system were provided in the photographic record. Initial readings were from pH 6.2 to 6.5 at a 15' depth 100 yards downstream from the pumping operation. A light mist was visible at the pumping site and foam was present on the river surface. No fish stress was apparent. Background river pH was approximately 7.3 both upstream of the barge and in the center of the channel. Activities were terminated for the day at 1730 hours. No significant periods of low pH were recorded.

Monitoring began at 0900 hours the morning of November 30 and was continuous until 1100 hours. At that time TAT/MDNR proceeded downriver to respond to a request from the City of St. Louis to obtain pH readings from the river adjacent to the Rush Island Power Plant. At 1220 hours a pH of 7.3 was recorded adjacent to the Rush Island Power Plant (~10 miles downstream). During the return trip upstream, monitoring was continued. Approximately 150' downstream from the effluent of the River Cement Company a pH of 6.9 was recorded. However, river pH quickly returned to 7.3 as the team continued upstream. At 1330 hours, a pH of 7.2 was recorded 100' downstream of the barge at a 21' depth. The pumping crew was authorized to increase the air pressure bubbling into the acid tank. Foam soon reappeared and by 1345 hours the pH stabilized at 6.0. Periodically, ambient air was screened using SO_2 and H_2SO_4 Draeger tubes. Ambient levels of SO_2 and H_2SO_4 were non-detectable during the release. Operations ceased for the day at 1630 hours.

The morning of December 1, a diver from Okie Moore sampled the contents of tank #2 (the first tank to be pumped). Sulfuric acid has a specific gravity of 1.8, and was concentrated at the bottom of the 10.5′ deep cargo tank. Nine feet had been loaded onto the barge initially. The sample from the 5′ level was 38.4% acid. Samples from 7 and 9 foot depths were approximately 93% acid. The pumping crew decided to install a larger air-lift in order to increase the pumping rate. The new air-lift was operational by 1020 hours. At 1125 hours, the 1000 yard pH was 7.4, while at 1130 hours the 100 yard pH was approximately 4.0. The pumping rate was reduced and a pH of 6.9 at an 11′ depth 100 yards downstream was recorded by 1145 hours.

TAT, MDNR, and the USCG had previously observed a steaming discharge from the Doe Run Co. into the Mississippi River. At 1222 hours MDNR and TATM Michalowski investigated this discharge. A sample of the discharge was collected by MDNR. The temperature of the sample was 41 C (105.8 F) and the pH was 10.4 (using the Orion pH probe).

At approximately 1245 hours, erratic pH readings from 7.1 to 3.9 were recorded 100 yards downstream at a 10′ depth. It was surmised these erratic readings were caused by waves from passing barges affecting the "normal" dispersal pattern. At 1345 hours TAT/MDNR proceeded downstream to Rush Island. Readings at both River Cement at 1420 hours and Rush Island at 1505 hours were pH = 7.3. Mechanical problems with the boat delayed the return to the barge site. At 1710 hours a pH of 4.2 was recorded 100 yards downstream from the barge at a 10′ depth, however, the pH was 7.2 at 300 yards. Operations ceased for the day at 1715 hours.

Monitoring began at 0850 hours on December 2 with a pH of 3.0 to 5.0 at 100 yards, 10′ depth, 5.0 at 200 yards, and 7.2 at 1000 yards. The flow of the air-lift was adjusted so a pH of approximately 6.0 could be maintained 100 yards downstream of the barge. At 1130 hours, Mr. Ken Teeter was relieved by Mr. Larry Alderson of MDNR. The monitoring crew proceeded downstream, where at 1400 hours pH values of 6.8 to 6.9 were recorded off River Cement. At approximately 1430 hours a pH of 7.8 was recorded off the Crystal City water intake. At 1500 hours TAT/MDNR returned to the barge site and TATM Michalowski was relieved by William Marcus. A pH of about 6.0 was maintained at 100 yards downstream from 1510-1730 hours when operations ceased.

The morning of December 3, a diver sampled tank #2 again, finding acid concentrations of .1% or less above the bottom sample, which had a concentration of 51.3% acid. Pumping of tank #2 continued until 0940 hours with river pH staying at approximate background levels. By 1020 hours preparations were completed for sampling the contents of tank #1 and pumping commenced at 1050 hours. A strong sulfur odor and signs of distressed fish were observed (See photo log.). With the registering of widely varying pH values down to 2.6, pumping stopped at 1100 hours. By 1115 hours the pH had returned to 6.8 at a 10′ depth 100 yards downstream, a slower pumping rate resumed. An increase in pumping rate

was approved by MDNR at 1135 hours when the pH had not dropped below 6.4. Significantly low pH values did not reoccur that day. Operations ceased at 1700 hours.

At 0730 hours on December 4, 1988, samples were again taken from tank #1. Results indicated an acid concentration of 57.5% at 3′ and 92% at 5′ and below the top of the tank. Monitoring commenced at 0815 hours with Teeter of MDNR and Geil and Marcus of TAT. A pH of approximately 6.0 was maintained 100 yards downstream at a 10′ depth until 0945 hours when the USCG boat proceeded upriver to refuel. Upriver pH was 7.3. Monitoring resumed at 1125 hours and a pH of about 6.0 was maintained through 1430 hours at the 100 yard point. At 1500 hours TATM Joe Parish relieved Geil and monitoring resumed with the recording of pH values from 5.9 to 6.8 at the 100 yard monitoring location. The flow rate was increased, which resulted in fluctuating values down to pH = 3.9. The pumping rate was reduced and pH values of about 6.4 were maintained until operations ceased at 1640 hours.

Sampling the morning of December 5 still indicated concentrations of 41.3% at 3′, 89.4% at 5′ and over 92% from 7′ down in tank #1. The water level in the Mississippi River had fallen 12-15" overnight and the bow deck of the barge was above water. The hatch of tank #1 was still under 3-5′ of water. Pumping commenced at 0800 hours and pH values of about 3.0 were soon recorded by the monitoring crew of Teeter and Marcus. The air flow rate was cut back and the pH had stabilized at about 6.0 by 0830 hours. At 0900 hours the USCG boat was dispatched to locate the source of an oil release upriver from Doe Run. Monitoring resumed at 0945 hours with stable pH values of about 6.0 recorded until 1440 hours. At this time an Okie Moore tugboat was maneuvering to a location shoreward of the sunken barge and the resultant turbulence is the presumed cause of pH values dropping to 2.0. By 1500 hours the tugboat was in position to redirect flow from the pumping operation away from the bank in the vicinity of the sunken barge and pH values at 100 yards downstream and 150′ east of shore had returned to about 6.0. Operations ceased at 1715 hours.

By the morning of December 6th, the river level had dropped another 6-8 inches. Sampling indicated most of the acid had been removed down to the 7′ level in tank #1, where the concentration was 77.8%. Pumping began at 0800 hours and pH values of about 6.0 were maintained 100 yards downstream. At 1200 hours the monitoring crew departed for Rush Island, where a pH of 7.8 was recorded at 1250 hours at a 10′ depth. By 1415 hours monitoring had resumed at Doe Run. Since pH values generally remained over 6.5, the flow rate was increased. No significantly low pH values were noted before operations ceased at 1715 hours.

Samples obtained the morning of December 7 indicated that tank #1 was nearly empty of acid. The primary activity now shifted to raising the barge. At 0800 hours Okie Moores' salvage tugboats and barges (including a barge outfitted with an A-frame to lift the sunken barge) began moving into position. Pumping of the remaining acid from

tank #1 and of water from tank #2 and void spaces within the barge commenced. Monitoring of pH values was performed at the tank #2 discharge point. The pH remained near background until 1330 hours when the monitoring line was set inside cargo tank #2. A pH of 2.2 was recorded one foot above the bottom of the tank. At 1400 hours monitoring resumed at the tank #2 discharge point and pH returned to near background levels. At 1540 hours, dewatering commenced on tank #1 and continued in wing tanks and other voids. By 1645, acid barge ACO 501 was considered successfully raised. Monitoring operations ceased at 1720 hours, though dewatering continued through the night.

At 0800 hours the morning of December 8, TAT, MDNR, and USCG began demobilization procedures. Acid barge ACO 501 had been raised and dewatered. By 1100 hours the barge was secured and TAT departed site.

FOLLOW UP

Initial plans were to flush acid barge ACO 501 at the Reidy Terminal in St. Louis. These plans had to be altered when it was determined that the acid sludge in the cargo tanks contained 16ppm lead. The barge, since it now contains a hazardous waste, would be emptied and cleaned at National Maintenance and Repair, Inc., in Hartford, Illinois. Mr. Robert Schleuger, the Illinois EPA regional manager, indicated that Region V EPA would monitor the cleanup and disposal of the sludge.

SUMMARY

An acid barge was loaded with approximately 1300 tons of 93% sulfuric acid sank at the dock of the Doe Run Co., Herculaneum, Missouri. The TAT was requested to assist with a controlled release of the cargo into the Mississippi River. Monitoring of river pH and surrounding ambient air commenced on November 29, and continued through December 7 when the barge was raised. The sulfuric acid cargo was successfully released to the river without any prolonged periods of significantly low pH, posing minimal hazard to the surrounding population and environment.

ATTACHMENTS

Site Location Map
Photodocumentation
Incident Notification Report

REGION VII INCIDENT NOTIFICATION REPORT

ENTERED BY JE
DATE 11/29
VERIFIED BY
DATE

✓ FIRST NOTIFICATION
✓ SUPPLEMENTAL OR CORRECTIONAL DATA ONLY

REVIEWED: PED
EPA Case Number: 11298 - D - 1900

RECEIVED
Date: (mm/dd/yy) 11/29/88 Time: 14 00 Recorded By: DOHERTY Inits: D
Through: EPA ___ NRC ___ State ___ NRC Case No.: _____ or State Case No.: ___-___-___

REPORTER
Reported By: CHOR LUEHON Organization Name: USCG
Organization: ___discharger ___public ___state ___local X federal ___other ___anonymous *
Address: _____ City: ST LOUIS MO
County: _____ State: MO Zip: _____-_____ Phone: (___)___-____

DISCHARGER (Is the reporter the discharger? ___)
Name: IDLE TOWING Company: _____
Address: _____ City: _____
County: _____ State LOUISC Zip: _____-_____ Phone: (___)___-____

INCIDENT LOCATION (Is the discharger's address the incident location? ___)
Street Address (proximity): ST LOUIS HARBOR M.M #152 UPPER MISS
City (Proximity): _____ County: _____ State: ___ Zip: _____-_____

DATE
Spill Date: (mm/dd/yy) 11/24/88 Spill Time: 13 45 Discovery Date: (mm/dd/yy) __/__/__ Time: __:__

MATERIAL
X Material Released ___Drill
Material Classification: ___TSCA ___CERCLA ___CWA 311 ___Other ___Unknown

	Material Cat.Code	Material Name	Concentration Quantity	Concentration U.Code	Quantity Spilled	Unit Code	Quantity Recovered	Unit Code
1.	4	SULFURIC ACID			2000	6		
2.								
3.								

MATERIAL CATEGORY CODES

1-PCB	5-Pesticides	9-Explosives	12-Unknown
2-Petroleum	6-Ag. Chemicals	10-Sewage	13-Other
3-Organic	7-Radiological	11-Foodstuff	
4-Inorganic	8-Biological		

UNIT CODES

1-barrels	5-tons	8-ppm
2-gallons	6-pounds	9-sheen
3-quarts	7-ounces	10-percent
4-pints		11-unknown

SOURCE OF SPILL OR RELEASE
___Highway Vehicle ___Railway Car X Waterway Vessel ___Aircraft ___Pipeline Carrier ID: _____
___Fixed Facility ___Transformer/Capacitor ___Tank (underground) ___Tank (aboveground)
___Discharge ___Other

Incident Description:
BARGE REPORTED MISSING
(EITHER SANK OR BROKE LOOSE FROM MOORING)
USCG IS SEARCHING AREA

RECEIVED

*If reporter requests to remain anonymous, **DO NOT** enter name or reference caller by name **ANYWHERE** on this form!

CAUSE OF SPILL RELEASE

___Transportation Accident X Equipment Failure ___Fire ___Fixed Release ___Human Error
___Natural Causes ___Dumping ___Unknown ___Other Cause Description:
MISSING BARGE

MEDIUM AFFECTED

X Water (__Groundwater X River __Stream __Creek __Reservoir __Lake __Pond __Canal __Ditch __Sewer)
NAME OF WATERWAY AFFECTED: POSSIBLY MISSISSIPPI
___Land ___Air ___Contained Within Facility
DESCRIPTION OF OTHER MEDIA AFFECTED:

DAMAGES

___Evacuation Number of Injuries:_____ Number of Deaths:_____ ___Property Damage > $50,000

AGENCIES NOTIFIED

___EPA/EP&R	___EPA/SPFD	X USCG	___IDNR	___State Fire Marshal	___Local Health	
___EPA/TAT	___EPA/CNSL	___OSHA	___KDHE	___State Conservation	___Local Fire	
___EPA/TOPE	___EPA/CIGL	___FEMA	X MDNR	___State Police	___Local Police	
___EPA/WATR	X EPA/PBAF	___HHS/CDC	___NDEC	___County	___None	___Other
___EPA/RCRA	___EPA/CRIM	Comments:				

RESPONSE

___State Investigation ___EPA on Scene EPA Activity No.:_____ TAT TDD No.:___-___-_____-_____
Response Action Taken:
USCG IS LOOKING FOR BARGE

___Physically Removed	___Stabilized	___Diluted	___Biodegraded	___Monitoring	___Unknown
___Neutralized	___Incinerated	___Recycled	___No Cleanup	___Pending	___Other

RESPONDING AGENCY

__EPA/EP&R	X USCG	__IDNR	__State Fire Marshal	__Local Health	__None
__EPA/TAT	__OSHA	__KDHE	__State Conservation	__Local Fire	__Unknown
__EPA/TOPE	__FEMA	__MDNR	__State Police	__Local Police	__Other
__EPA/RCRA	__HHS/CDC	__NDEC	__County Hazmat Unit	__Local Hazmat Unit	
__EPA/CRIM	__Other Federal	__Other State	__Other County	__Other Local	

COMMENTS:

died about an hour later at Trigg SAT 11/26/88

Crews try to raise acid barge in Mississippi River K.C S-7A

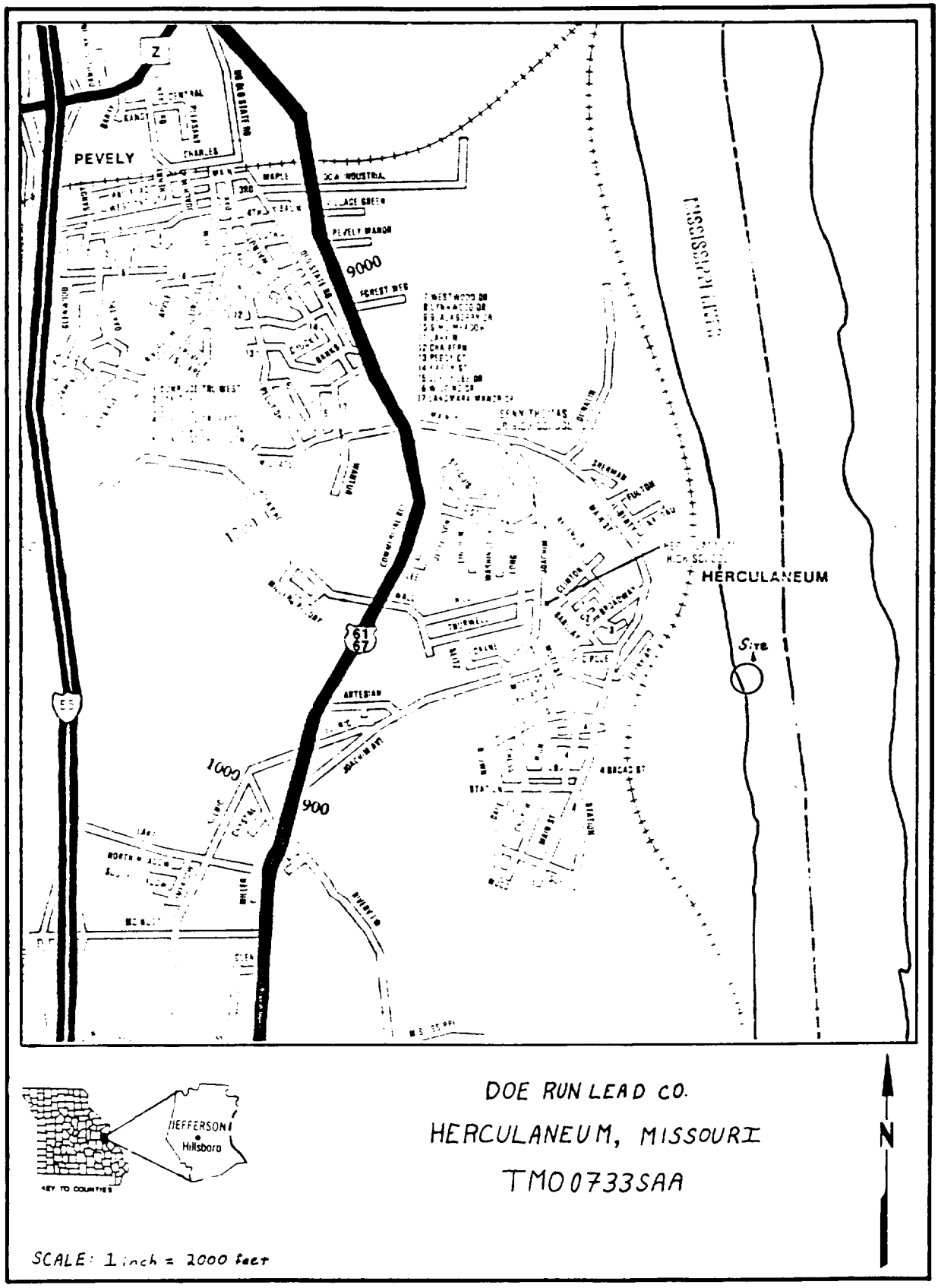
ST. LOUIS — Salvage crews worked Friday to raise a barge containing sulfuric acid that sank in the Mississippi River about 30 miles south of St. Louis.

Coast Guard Lt. Bill Wheeler said the barge had been reported missing from the Doe Run Min- ing [illegible] at Herculaneum on We[illegible] it was found under wa[illegible]stance downriver.

Wh[illegible]s on the water downstream [illegible] the sunken barge indicated that the acid was not leaking.

CHD LUCAS. USCG CALLED SUNDAY AT 11/27/88 SAID BARGE WAS DISCOVERED LEAKING BY DIVERS. USCG RECOMMENDS CONTROLLED RELEASE OF PRODUCT TO RECOVER BARGE MEETING IN HERCULANEUM 11/28/88 @ 1900 WITH DOE RUN & HOUR TO DISCUSS. KEEFER TO ATTEND
TAT DISPATCHED IN PPK 11/28/88

CHEMTREC 1-800-424-9300 ** EPA/TAT 913-247-8482 (primary) 913-274-6156 (back-up)
Iowa 515-281-8694 ** Kansas 913-296-1500 ** Missouri 314-634-2436 ** Nebraska 402-471-2186


PEVELY
HERCULANEUM
Site
61
67
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JEFFERSON
Hillsboro
KEY TO COUNTIES
DOE RUN LEAD CO.
HERCULANEUM, MISSOURI
TM0733SAA
N
SCALE: 1 inch = 2000 feet

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